Manufacturing Extension Centers and Private Consultants: Collaboration or Competition?

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Abstract

Congress directed the National Institute of Standards and Technology (NIST) -- an agency of the U.S. Commerce Department -- to establish a program to help small manufacturers improve their performance. Beginning with three centers in 1989, the NIST Manufacturing Extension Partnership (MEP) has expanded to include centers in 42 states and Puerto Rico. The manufacturing extension centers (MECs) help companies define their needs, develop an appropriate course of action, and secure needed resources to resolve identified problems. One issue that emerged early on in the program's evolution is whether MECs compete with private consultants. This study examines this question. Based on surveys of companies and consultants, the study concludes that MECs do not compete directly with private consultants. In fact, these organizations actually expand the market for consultants. Furthermore, MECs encourage greater openness of manufacturers to change, enabling them to benefit more from outside assistance. As a result, companies working with MECs are up to six times more likely to plan important changes in their operations compared to similar manufacturers that have not participated in MEC programs.

INTRODUCTION

There are 381,000 small manufacturing establishments in the United States, employing nearly 12 million people and producing more than half the total value of manufactured goods. The majority of these firms are suppliers of parts and subassemblies to larger manufacturers. As large companies increasingly outsource to reduce costs, the performance of their suppliers is becoming more important. However, many small firms are operating far below their potential. As a result of lagging use of modern production technologies and management practices, productivity among smaller manufacturers is growing at half the rate of larger companies. [1][2] Limited financial resources, time constraints, and lack of expertise among small manufacturers represent significant barriers to change. [3]

Companies that fail to perform up to standards must either take corrective actions or risk going out of business. This is in keeping with the argument that the market, rather than the government, should be the driving force behind industrial modernization. However, there are reasons to believe that the market is not perfect. It is difficult today to avoid references in the economics literature to information asymmetries, moral hazards, transaction costs, monopolistic competition, externalities and other market imperfections.[4][5] These imperfections make it difficult for companies to secure needed assistance and give rise to sub-optimal economic performance. In particular, the market for consulting services for small manufacturers does not appear to be well-organized. On the one hand, the cost of identifying, hiring and managing consultants is often prohibitive for small manufacturers. On the other hand, private consulting firms are often reluctant to serve small firms because typical contracts are too small to justify their time and expense. [6]

Recognizing these and other related issues, Congress directed the National Institute of Standards and Technology (NIST) -- an agency of the U.S. Commerce Department -- to establish a program to help small manufacturers improve their performance. Beginning with three centers in 1989, the NIST Manufacturing Extension Partnership (MEP) has expanded to include manufacturing extension centers in 42 states and Puerto Rico. MECs are operated by state agencies, not-for-profit organizations, community colleges and universities. Typically, they help companies define their needs, develop appropriate courses of action, secure needed resources to resolve identified problems, and implement recommended changes in manufacturing practices. The focus on assistance ranges from narrow technical problems related to specific production processes to broad strategic questions concerning the basic direction of companies. All centers rely on experienced field agents who provide companies with advice and practical assistance. However, because of the breadth of issues that small manufacturers needs to address, centers have developed an extensive network of private consultants, economic development organizations, community colleges, and universities.

Like most public sector initiatives, manufacturing extension programs are coming under heightened pressure to demonstrate results and justify continued funding. Even as funding has increased, these types of programs continue to be criticized as unwarranted government forays into the private marketplace. Specifically, people question whether or not manufacturing extension centers compete directly with private consultants and, more generally, whether these programs are effective. This article addresses these questions. It presents the results of a study undertaken to determine the extent to which manufacturing extension programs provide services to small manufacturers that they would not have received otherwise from private consultants. It also examines whether the receipt of MEC services increases the likelihood of firms adopting new manufacturing practices that might ultimately lead to increased company performance.

THE DATA

To obtain the necessary data, written surveys were mailed to three separate groups: [2]

- **MEC clients**. A survey was administered to a stratified, random sample of 750 clients of the seven original manufacturing extension centers. The strata were defined in terms of employment and industry to help ensure that the sample was representative of the client population. The survey contained a series of questions concerning the company's relationship with both MEC centers and private consultants, along with other questions about manufacturing practices. Out of these 750 companies, 119 returned completed questionnaires.
- **Comparison group**. Similar surveys were also mailed to 800 small manufacturers that had not received services from any of the MECs. This comparison group was constructed to match the MEC group in terms of firm size and industrial classification. Eighty-four of these firms returned completed surveys.
- **Private consultants**. Finally, a third survey was administered to 202 private consultants that had participated in the manufacturing extension program; 73 consultants returned completed questionnaires.

An extensive analysis of the survey was undertaken involving a detailed examination of the relationships among characteristics of manufacturing firms, the nature of MEC services, the use of private consultants, and subsequent benefits. The results of this analysis are presented in the following sections.

DO MECs COMPETE WITH PRIVATE CONSULTANTS?

The need for consulting services was clearly apparent in the survey responses of both MEC clients and manufacturers in the comparison group. The vast majority of small manufacturers responding to the survey had at some point in the past made use of private consultants. Overall, eighty-one percent of MEC clients had called on the services of private consultants, while 73 percent of non-clients had used private consultants in the past. The reasons cited for retaining consultants are summarized Table 1.

Table 1. Reasons for Seeking the Assistance of a Private Consultant

(INSERT ABOUT HERE)

The fact that MEC clients are more likely to seek the help of private consultants provides some insights into the possible relationship between MEC services and the use of private consultants; this finding suggests that being an MEC client *increases* the likelihood of employing private consultant to address specifc needs. To investigate this question more thoroughly, the survey asked MEC clients to compare the services they receive from MECs to those of private consultants. Specifically, MEC clients who have that have used private consultants were asked to characterize the services offered by the MECs. As shown in Figure 1, the vast majority of MEC clients indicate that MECs provide services that either complement the work of private consultants, or are otherwise unavailable to them.[3] Although 23 percent did report that MECs "bid against private technical consultants for contracts," only seven percent indicated that MECs simply offer the same set of services available through private consultants.

Figure 1. Relationship Between MECs and Private Consultants

(INSERT HERE)

Additional survey results suggest that MECs play an important role in helping small manufacturers identify sources of outside assistance to address a variety of business and manufacturing issues. Companies often have trouble defining the specific nature of problems confronted on the shop floor or back offices. An objective diagnosis of the root causes of problems is a critical first step in fashioning an appropriate response. The results of the survey suggest that clients perceive MECs as playing an important role in this type of front-end assessment. With this assessment in hand, companies are in a better position to identify the specific nature of assistance they need and to define a scope of work for private consultants.

This informational role played by the MECs is born out in the survey responses shown in Table 2. A majority of companies reported that MECs help identify outside sources of assistance and help manage MEC clients' relationship with private consultants. These results suggest that MECs also help clients identify the most appropriate private consultants to address those problems.[4]

Table 2. MEC Role in Helping Companies Use Private Consultants

(INSERT HERE)

The need for this type of information assistance is supported by responses to other questions included in the survey. For example, as shown in Table 3, a significant number of companies indicated that the process of identifying and selecting appropriate and trustworthy private consultants was problematic. Other aspects of working with consultants seem to bring challenges as well: over one third of the companies that have used consultants in the past reported difficulties during the initial phase of needs assessment. A similar number indicated problems with poor service during the consulting engagement itself. Taken together with the portrait of the role of MECs presented above, these results suggest that MECs add value precisely in those areas where small firms feel most at risk in their relationships with private consultants.[5]

Table 3. Factors Discouraging Companies From Using Private Consultants

(INSERT HERE)

MECs often help their clients overcome a reluctance to use private consultants. When asked how the absence of the MEC would affect the likelihood of hiring private consultants, 40% of the firms responded that they would be less likely to use the services of private consultants if the MEC did not exist. This suggests that MECs have actually served to *expand* the market for private consultants. This finding is consistent with the views of private consultants. Nearly three out of four consultants responding to the survey suggested that the services offered by the MEC were "beneficial to their business."

In addition to providing an informational and facilitating role in the relationship between small manufacturers and private consultants, our survey results indicate that MECs also offer services that are currently not supplied by private consultants. Most companies that have received MEC services report that MECs are either the only available source or are considered a better source for a number of different services. Many MEC clients reported that the MECs are the sole or more effective source of informal assistance, unbiased information, and cost-effective assessments of operations (Table 4).

Table 4. Type and Quality of Assistance Provided by MECs to Clients

(INSERT HERE)

To summarize, the survey results indicate that MECs play an important role in assisting companies to obtain information about the various types of modernization services, including those provided by private consultants, that are available to small producers. The findings show that MECs do not displace the services provided by private consultants, rather they tend to generate more business for them. In addition to this information service, MECs also provide assistance in other areas, such as front-end needs assessments and informal trouble-shooting, that is currently not being supplied by private consultants.

THE ROLE OF MECs IN IMPROVING PERFORMANCE

In our study we also sought to identify an additional set of benefits small manufacturers may be receiving from their interaction with MECs. Specifically, we were interested in gauging the impact of MEC services on the manufacturing performance of MEC clients. If it is true that MECs play an important role in facilitating working relationships between small manufacturers and private consultants, then companies that are MEC clients should be more likely to make changes in their operations than similar companies that have not received MEC services. Table 5 summarizes the results of a series of logistic regression analyses comparing the likelihood of plans to initiate specific business improvements for MEC clients and manufacturers in the comparison group. In every case, involvement with an MEC increases the likelihood of planning to adopt new manufacturing practices.

Table 5. Greater Likelihood of MEC Clients Planning Actions[6]

(INSERT HERE)

These results show that MEC clients are up to six times more likely to plan to undertake specific actions than non-MEC clients of a similar size, type of operation, and production volume. The largest contrast between MEC clients and similar non-participating manufacturers relates to their plans to apply statistical quality control methods.

The data in Figure 2 present a similar picture. The bars in the graph represent the estimated probabilities of typical companies in the two groups planning to take specific actions.[7] Both MEC clients and non-clients are most likely to have plans to provide training for workers. However, a typical MEC client has a 71 percent chance of planning increased worker training. In contrast, a typical company that has not been involved with an MEC has only a 45 percent chance of planning to initiate training programs.

Figure 2. Likelihood of Typical MEC Clients and Non-clients Planning Actions

(INSERT HERE)

It is important to remember that the comparison of MEC clients and non-clients focused on companies that have used private consultants. The results, therefore, reflect the additional impact of MECs on companies above and beyond benefits derived from private consultants. Significantly, consultants echoed the sentiment that involvement with an MEC increases their own effectiveness. More than 80 percent stated that interaction with an MEC makes companies "more open to change," and 78 percent indicated that this interaction resulted in companies being "more able to benefit from consulting services."

CONCLUSIONS

The principal conclusions of the study are as follows:

- **MECs do not compete directly with private consultants**. Most clients perceive the services offered by MECs to be completely different than, or complementing, those provided

by private consultants. In fact, most consultants involved with the program state that MECs are beneficial to their business.

- **MECs provide assistance that enhances the relationship between manufacturers and private consultants**. MEC assistance includes help in front-end needs assessment, identification and selection of an appropriate consultant, and management of the ongoing client / consultant relationship. All are areas where small manufacturers tend to feel most inexperienced and in need of assistance. By providing unbiased information and reducing uncertainties, MECs help expand the market for private consultants.
- **MEC clients are more likely to plan important changes in their operations as a result of the program.** MEC encourage greater openness to change, enabling companies to benefit more from outside assistance. As a result, MEC clients are up to six times more likely to plan on taking actions designed to improve performance than similar manufacturers that have not participated in MEC programs.

These findings suggest that, primarily through their provision of referrals and related information-brokering services, manufacturing extension programs are helping firms overcome what appear to be imperfections in the market for small company consulting services. Moreover, companies receiving manufacturing extension services are more likely to adopt the kinds of technological and organizational changes needed to compete more effectively in the marketplace. These results imply a role for government involvement in economic development in areas in which private markets are not currently providing sufficient information or services to ensure high levels of economic performance.

[1] Eric Oldsman is President of Nexus Associates, Inc., an economics and management consulting firm based in Belmont, Massachusetts, USA. The author wishes to acknowledge the support provided by the Modernization Forum and, in particular, the comments and suggestions offered by Jack Russell and Matt Kane. The opinions, findings, and conclusions are, however, those of the author and do not necessarily reflect the view of the Modernization Forum.

[2] Dun & Bradstreet Information Services was commissioned to administer the surveys. D&B was responsible for all mailings, telephone follow-up, and data entry. All questions refer to events occurring in 1994.

[3] Firms with previous experience working with private consultants were considered to be in a better position to judge whether MECs compete directly with consultants. As noted above, 81% of MEC clients reported experience working with private consultants.

[4] MECs have established networks of private consultants willing and able to work with small manufacturers. This sometimes entails negotiated lower rates.

[5] This is consistent with the findings of a recent report issued by the National Research Council which stated, "It is difficult for owners and managers of smaller companies to find high-quality, unbiased information, advice and assistance." [7]

[6] These actions were chosen based on descriptive information pointing to where the largest potential differences between MEC clients and non-clients might lie, and also on the basis of their general importance to companies engaged in modernization activities.

[7] A "typical" company had 55 employees, was equally likely to be an OEM vs. a supplier, and had a 20% chance of being a high (vs. low or medium) unit volume producer.

References

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[3] P. Shapira, Helping Small Manufacturers Modernize, Issues in Science and Technology, 7(1) (1990) 49.

[4] John Eatwell, Murray Milgate, and Peter Newman (Eds.), Allocation, Information and Markets. W.W. Norton, New York, 1989.

[5] W. Lazonick, Business Organization and the Myth of the Market Economy. Cambridge University Press, Cambridge,1991.

[6] National Institute of Standards and Technology, Delivering Results: A Progress Report from the National Institute of Standards and Technology, 1995.

[7] National Research Council, Learning to Change: Opportunities to Improve the Performance of Smaller Manufacturers. National Academy Press Washington, DC, 1993.

Table 1. Reasons for Seeking the Assistance of a Private Consultant

	% of respondents	
Reasons	**MEC clients**	**Non-clients**
Need a specific skill not available in-house	97%	88%
Need to solve a specific problem	82%	75%
Cannot justify the overhead of in-house expertise	61%	53%
Need an objective outside opinion	60%	47%

Table 2. MEC Role in Helping Companies Use Private Consultants

MEC role	% of respondents
Help identifying and selecting consultants	78%
Front-end help in defining or framing needs	78%
Help managing the work of consultants	58%
Help implementing consultant recommendations	55%

Table 3. Factors Discouraging Companies From Using Private Consultants

Factors	% of respondents
Problems identifying and selecting a consultant	71%
Problems with front-end needs assessment	39%
Problems with poor service from consultants	36%

Table 4. Type and Quality of Assistance Provided by MECs to Clients

Area	% of respondents		
	MEC has been the *only* source	**MEC has been a *better* source**	**MEC has been the *only* or *better* source**
Offered or provided informal assistance / trouble-shooting at little or no cost	23%	49%	72%
Performed cost-effective assessment of operations and discussion of potential work	20%	44%	64%
Presented unbiased information on all relevant products and services	14%	51%	65%

Table 5. Greater Likelihood of MEC Clients Planning Actions

Actions planned in the next five years	MEC clients relative to non-clients
Apply statistical QC methods	6.0 times more likely**
Gather quality and production data	5.4 times more likely**
Use computer-based information systems (MIS)	4.3 times more likely**
Improve pollution control/disposal	4.0 times more likely**
Use manufacturing resource planning (MRP)	3.6 times more likely**
Redesign production floor layout	3.5 times more likely**
Develop/expand management training	3.2 times more likely**
Develop/expand worker technical training	3.0 times more likely*
Implement just-in-time (JIT) delivery	2.8 times more likely*
Empowerment (e.g., work teams)	2.6 times more likely*
Utilize activity-based costing/management	2.3 times more likely*
Obtain certification or meet quality standards	1.9 times more likely*
Use or add computer numerical control machines	1.8 times more likely
Implement Total Quality Management (TQM)	1.3 times more likely

** indicates that there is less than a 5% chance that the general population of MEC clients and non-clients have the same probability of planning the given action. * signifies less than a 10% chance of the probabilities being the same.

Figure 1. Relationship Between MECs and Private Consultants

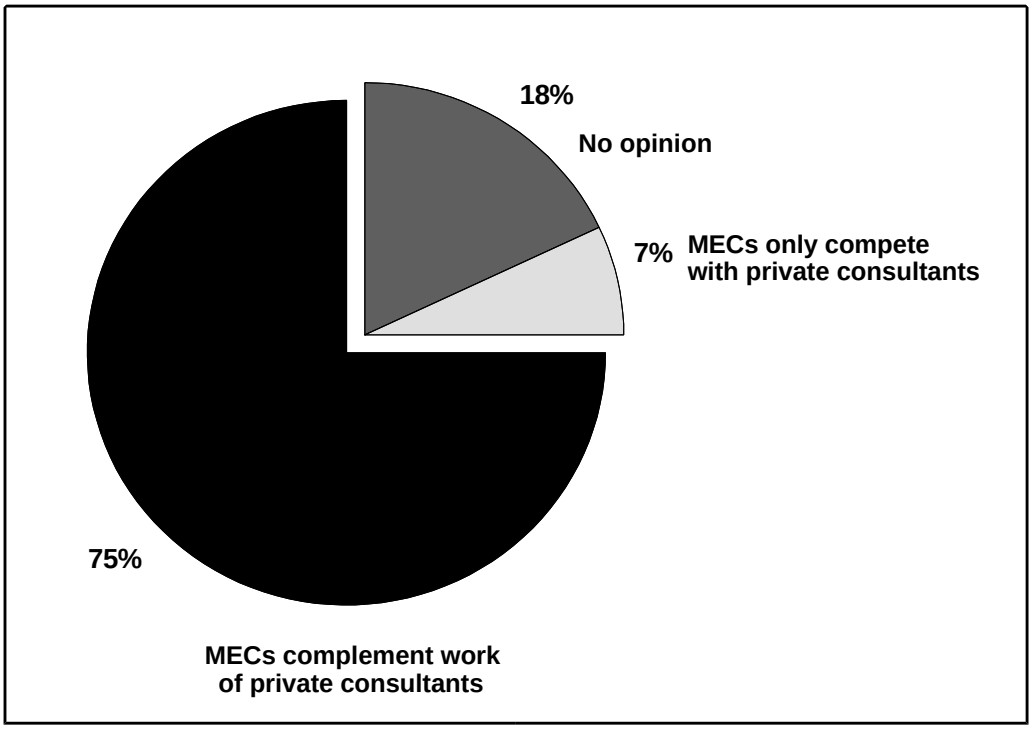
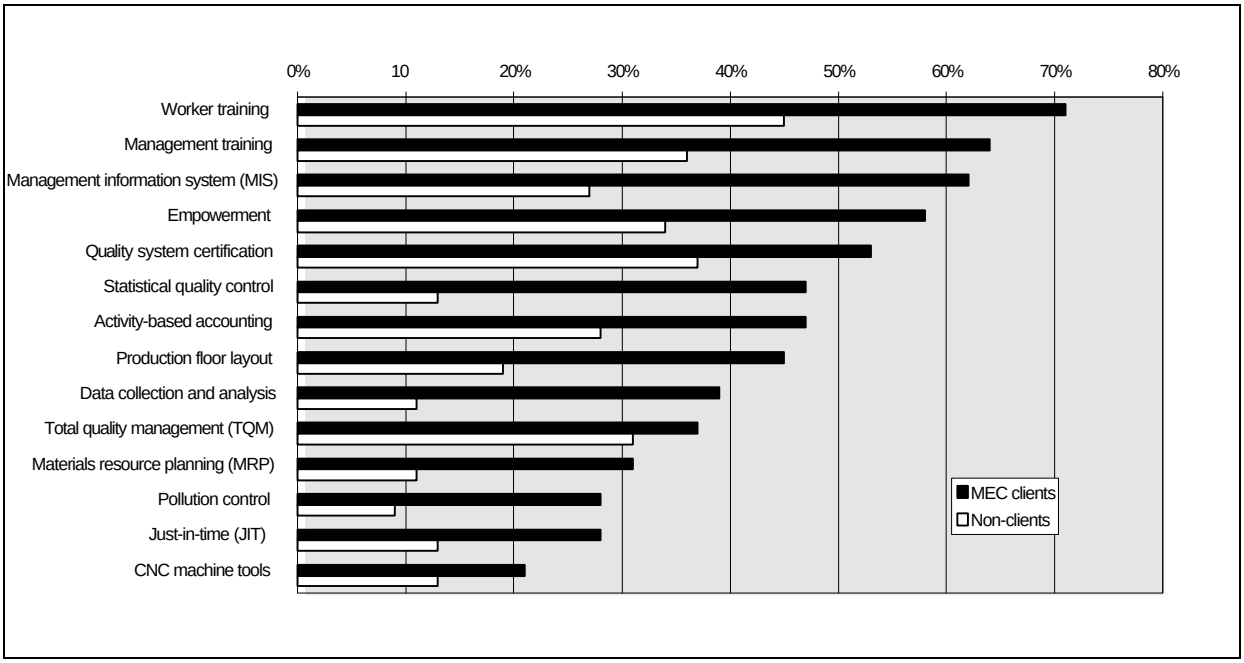


Figure 2. Likelihood of Typical MEC Clients and Non-clients Planning Actions



Nexus Associates, Inc. is an economics and management consulting firm based in Belmont, Massachusetts. The firm specializes in performance measurement, program evaluation, market research, and economic analysis. Assignments are typically undertaken within the context of strategic planning, organizational development, and process improvement efforts. Since it was founded in 1991, the firm has established a solid reputation for high quality work that meets the needs of its clients on time and within budget.

Nexus Associates has worked with government agencies, quasi-public authorities, not-for-profit organizations, federal laboratories, universities and private corporation both in the United States and abroad. Clients have included the U.S. Department of Commerce, National Institute of Science and technology, Massachusetts Technology Collaborative, New York State Science and technology Foundation, Industrial Technology Institute, Tufts University, World Bank, Inter-American Development Bank, Mexican Government, Hong Kong Government, and General Motors.

Dr. Eric Oldsman -- the founder and president of Nexus Associates --- has more than 20 years of consulting experience. Prior to establishing the firm, he was a senior consultant at Arthur D. Little, Inc. and served as a program officer at PACT, Inc. He holds a Ph.D. in public policy from Harvard University and B.A in economics from Brown University.